

REMARKS

Claims 1-6 and claims 8-13 are currently pending. Claims 1 and 9 stand rejected under 35 USC §102(b) and claims 2-6, 8, and 10-13 stand rejected under 35 USC §103(a). Claims 1-5 and 8-10 have been amended.

The Applicants appreciate the Examiner's thorough examination of the subject application and respectfully request reconsideration of the subject application based on the above amendments and the following remarks.

35 USC § 102(b) REJECTIONS

Claims 1 and 9 stand rejected under 35 USC § 102(b) as being anticipated by U.S. Patent Number 6,201,893 to Shiraiwa ("Shiraiwa" or the "Shiraiwa Reference"). The Applicants respectfully traverse the grounds for rejection based on the following remarks.

Claim 1 recites an image processing device that comprises a display means having predetermined gradation characteristics; image input means for inputting an image composed of a plurality of pixels; contrast estimation means for estimating contrast of the image; and luminance correction means for correcting luminance of each of pixels constituting the image based on estimated contrast from the contrast estimation means and the gradation characteristics of the display means. Claim 9 recites an associated method of the apparatus claims. Consequently, the present invention provides an image processing device and methods that correct "the luminance of each pixel on the basis of the contrast of the input image and the gradation characteristics of the display device 35." Specification, page 34, lines 6-9 (Emphasis added). As a result, the recited gradation correction makes "the gradation characteristics of the display device 35 itself linear." Id., page 34, line 18 to page 35, line 1. More specifically, the relationship between luminance values before and after correction "is uniquely determined depending on the gradation characteristics of the display device 35." Id., page 35, lines 9-10 (Emphasis added).

In his response to the Applicants' previous arguments, the Examiner asserts the following:

- The image processing section 35 of Shiraiwa is analogous to the claimed "luminance correction means";
- Shiraiwa's "luminance correction means" is based on estimated contrast or the color range; and
- Shiraiwa's "luminance correction means" is based on gradation characteristics.

Detailed Action at page 2. More specifically, the Examiner maintains that, it is well known in the art that display means have predetermined gradation characteristics associated with them and, further, that gradation conversion curves are used to format image data for display with a given display device. The Examiner also cites U.S. Patent Number 6,246,780 to Sato ("Sato" or the "Sato Reference") to support his assertions. The Applicants respectfully disagree.

First, Sato is completely silent about correcting the luminance of each pixel on the basis of the contrast of the input image and the gradation characteristics of the display device. Referring to Sato's FIG. 3 and the accompanying disclosure, an A/D converter 11 converts an analog signal from the imaging device to "a predetermined number of gradation levels", e.g., a 24-bit digital signal comprising an 8-bit red R signal, an 8-bit green G signal, and an 8-bit blue B signal. See, e.g., Sato, col. 3, lines 46-50. It is well known to those skilled in the art that, conventionally, digital devices use pseudo-gradation levels comprising combinations of ON and OFF dots to produce halftone images because digital systems cannot change light transmittance in a similar manner as analog devices. See, e.g., Sato, col. 1, lines 21-28. Typically, the gradation levels are 0 to 255, which requires an 8-bit signal ($2^8 = 256$). Hence, in Sato, the converted analog signal is nothing more than gradation level signals for RGB and is totally unrelated to the gradation characteristics of the display device.

According to Sato, a gradation conversion circuit 12 converts the 24-bit signal to a 3-bit signal comprising a 1-bit R, a 1-bit G, and a 1-bit B signal, which provides only two gradation levels per color, i.e., ON or OFF. See, e.g., Id., col. 5, lines 21-26; Cf. with col. 6,

lines 35-37. Once again, the gradation level is either ON or OFF, which is totally independent of the gradation characteristics of the display device.

In summary, the Sato reference does not teach, mention or suggest or support the Examiner's assertion that there is an "inherently tight nexus between display devices and gradation conversion curves." Sato merely teaches ON or OFF, which is independent of and, therefore, would be the same for any display device. This teaches away from the "uniquely determined" relationship between luminance values before processing the gradation correction process and luminance values after processing the gradation correction process, which can be different for all display devices. See, e.g., Specification, page 25, lines 4-10.

Nor does the Shiraiwa reference teach such an "inherently tight nexus". The mere mention of "gradation characteristic, gradation conversion curve, the gradation conversion look-up table" does not inherently convey to one skilled in the art that luminance level correction would be based on the gradation characteristics of the display device. Shiraiwa discloses an image reproduction apparatus and method for converting an image into an image signal by employing image reproduction parameters obtained from a plurality of image pick up data. Shiraiwa does not disclose a feature that considers both "contrast" and "gradation characteristics of display means". Shiraiwa simply does not teach, mention or suggest correcting luminance by raising the contrast of the image on the basis of estimated contrast and correcting luminance of the pixels constituting the image based on the predetermined gradation characteristics of the display means.

Moreover, Shiraiwa discloses an image reproduction apparatus and method for converting an image into an image signal by using reproduction parameters obtained from a plurality of image pickup data. If only one image pickup data set was designated, the image pickup data set is converted into image data by normal reproduction processing. See, e.g., Shiraiwa, col. 5, lines 7-10; FIG 2. In contrast, the present invention can estimate the contrast of an image from a single image.

Therefore, it is respectfully submitted that, claims 1 and 9 are not anticipated or made obvious by the Shiraiwa reference and, further, satisfy all of the requirements of 35 U.S.C. §

100, et seq., especially § 102(b). Accordingly, claims 1 and 9 and all claims depending therefrom are allowable. Moreover, it is respectfully submitted that the subject application is in condition for allowance. Early and favorable action is requested.

35 USC § 103(a) REJECTIONS

Claims 2, 6, 8, and 10 stand rejected under 35 USC § 103(a) as unpatentable over Shiraiwa in view of US Patent Number 6,240,206 to Tokuyama ("Tokuyama" or the "Tokuyama Reference"); claim 3 stands rejected under 35 USC § 103(a) as unpatentable over Shiraiwa in view Tokuyama further in view of an article by Takagi, i.e., "Selective Image Sharpening"; claims 4 and 5 stand rejected under 35 USC § 103(a) as unpatentable over Shiraiwa in view of Tokuyama further in view of US Patent Number 6,266,439 to Pollard and US Patent Number 6,035,061 to Katsuyama; and claims 11 and 12 stand rejected under 35 USC 103(a) as unpatentable over Shiraiwa in view of US Patent Number 5,982,926 to Kuo ("Kuo" or the "Kuo Reference"). The Applicants respectfully traverse these rejections based on the following remarks.

Claims 2, 6, 8, and 10

The deficiencies of the Shiraiwa reference have been detailed above in our 35 USC § 102(b) discussion. Further, Tokuyama cannot make up for the deficiencies of the Shiraiwa reference. Specifically, the Tokuyama reference does not teach, mention or suggest correcting luminance by raising the contrast of the image on the basis of estimated contrast and correcting luminance of the pixels constituting the image based on the predetermined gradation characteristics of the display means.

In his Detailed Action, the Examiner states that,

It would have been obvious to one reasonably skilled in the art at the time of the invention to modify the image processing system of Shiraiwa to include character region extraction means and sharpening means for sharpening character regions at a higher level than non-character regions as taught by Tokuyama. Such a modification would have allowed for an image processing apparatus capable of improving

the quality of an image comprised of character regions and non-character regions.

Shiraiwa and Tokuyama also do not recognize the problem of the present invention with respect to "the deterioration of the visibility of the image based on both the difference between a resolution of the image and a resolution of display means, and the gradation characteristics of display means". As a result, the Applicants respectfully assert that, the effect of preventing the problem aforementioned and for preventing the deterioration of the visibility is not be made obvious by Shiraiwa and Tokuyama. Furthermore, since Shiraiwa does not describe "character regions and non-character regions", we believe that Shiraiwa does not motivate one to combine Shiraiwa with Tokuyama.

Therefore, it is respectfully submitted that, claims 2, 6, 8, and 10 are not made obvious by the Shiraiwa reference in view of Tokuyama and, further, satisfy all of the requirements of 35 U.S.C. 100, et seq., especially § 103(a). Accordingly, claims 2, 6, 8, and 10 are allowable. Moreover, it is respectfully submitted that the subject application is in condition for allowance. Early and favorable action is requested.

Claim 3

Nor can the Takagi article make up for the deficiencies of the Shiraiwa and Tokuyama references. Specifically, the Takagi article does not teach, mention or suggest correcting luminance by raising the contrast of the image on the basis of estimated contrast and correcting luminance of the pixels constituting the image based on the predetermined gradation characteristics of the display means.

Therefore, it is respectfully submitted that, claim 3 is not made obvious by the Shiraiwa reference in view of Tokuyama further in view of Takagi and, further, satisfies all of the requirements of 35 U.S.C. § 100, et seq., especially § 103(a). Accordingly, claim 3 is allowable. Moreover, it is respectfully submitted that the subject application is in condition for allowance. Early and favorable action is requested.

Claims 4 and 5

Nor can the Pollard and/or Katsuyama references make up for the deficiencies of the Shiraiwa and Tokuyama references. Specifically, neither Pollard nor Kasuyama teaches, mentions or suggests correcting luminance by raising the contrast of the image on the basis of estimated contrast and correcting luminance of the pixels constituting the image based on the predetermined gradation characteristics of the display means.

Therefore, it is respectfully submitted that, claims 4 and 5 are not made obvious by the Shiraiwa reference in view of Tokuyama further in view of Pollard and Katsuyama and, further, satisfy all of the requirements of 35 U.S.C. § 100, et seq., especially § 103(a). Accordingly, claims 4 and 5 are allowable. Moreover, it is respectfully submitted that the subject application is in condition for allowance. Early and favorable action is requested.

Claims 11 and 12

The deficiencies of the Shiraiwa reference have been detailed above in our 35 USC § 102(b) discussion. Further, the Kuo reference cannot make up for the deficiencies of the Shiraiwa reference. Specifically, the Kuo reference does not teach, mention or suggest correcting luminance by raising the contrast of the image on the basis of estimated contrast and correcting luminance of the pixels constituting the image based on the predetermined gradation characteristics of the display means.

Therefore, it is respectfully submitted that, claims 11 and 12 are not made obvious by the Shiraiwa reference in view of Kuo, and, further, satisfy all of the requirements of 35 U.S.C. § 100, et seq., especially § 103(a). Accordingly, claims 11 and 12 are allowable. Moreover, it is respectfully submitted that the subject application is in condition for allowance. Early and favorable action is requested.

The Applicants believe that no additional fee is required for consideration of the within Response. However, if for any reason the fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge Deposit Account No. **04-1105**.

Respectfully submitted,

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